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EXAMINER	
ALEJANDRO MULERO, LUZ L	
ART UNIT	PAPER NUMBER
1763	6

DATE MAILED: 04/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/749,916	Applicant(s) HUBACEK ET AL.	
	Examiner Luz L. Alejandro	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *11-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02/04/2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-10, drawn to an apparatus, classified in class 156, subclass 345.

II. Claims 11-20, drawn to a method, classified in class 438, subclass 706.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to practice another and materially different process such as processing a non-semiconductor substrate.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation between examiner Duy Deo with attorney Peter Skiff on 02/19/02 a provisional election was made with traverse to prosecute the invention of group I, claims 1-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

The drawings are objected to because reference number 10 appears twice in fig. 2, since both reference numbers are representing the electrode assembly it is requested that one of them be deleted. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Murai, JP 2-20018.

Murai shows the invention as claimed including a low resistivity electrode 2 adapted to be mounted in a parallel plate plasma reaction chamber 5 (see fig. 1) used in

substrate processing, the electrode comprising: a single crystal silicon electrode having an electrical resistivity of less than 0.05 ohm-cm (see page 86, first column, lines 22-26), the electrode having an RF driven surface on one side thereof (see abstract) which is exposed to plasma.

Claims 1-3, and 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Saito et al., U.S. Patent 5,993,597.

Saito et al. shows the invention as claimed including a low resistivity electrode adapted to be mounted in a parallel plate plasma reaction chamber used in semiconductor substrate processing (see col. 1, lines 6-8), the electrode comprising: a single crystal silicon electrode having an electrical resistivity of 0.0001 ohm-cm (see abstract; col. 1, lines 64-65; col. 3, lines 65-67; examples 6-11 of Table 1; col. 4-line 65 to col. 5-line 5; col. 6, lines 10-15; and examples 4 and 7 of Table 2). Since the electrode is used in a parallel plate reactor, it is inherent that the electrode has a surface which is grounded or is coupled to RF power, the surface being exposed to plasma. Furthermore, the electrode comprises a plurality of bores having diameters of 0.5 mm, 0.020 inch, (see col. 3, lines 15-17, 56-57, and 65-66; col. 5, lines 1-3; and col. 6, lines 14-15). It is inherent, in view of this disclosure, that the electrode is being used as a showerhead electrode.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murai, JP 2-20018 or Saito et al. in view of Machida et al., U.S. Patent 5,853,523 or Degner et al., U.S. Patent 5,074,456.

Murai and Saito et al. are applied as above but lack anticipation of disclosing that the electrode has heavy metal contamination of less than 10 ppm. Machida et al. (see col. 3, lines 57-60) and Degner et al. (col. 3, lines 52-64) disclose that in order to achieve high purity in an electrode the metal contamination should be less than 10 ppm. Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of the Murai

and the Saito et al. reference as to comprise an electrode having a metal contamination of less than 10 ppm because this will lead to an electrode having high purity.

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murai, JP 2-20018 or Saito et al. in view of Degner et al., U.S. Patent 5,074,456 or Lilleland et al., U.S. Patent 6,073,577.

Murai and Saito et al. are applied as above but lacks anticipation of disclosing the claimed bonding and clamping structures for securing the electrode to a support member. Degner et al. discloses a parallel plate plasma reactor in which the upper electrode can be secured to a support member by either a bonding member comprising a joint having an electrically conductive material between the electrode and the support member and which includes an electrically conductive filler (see col. 5, lines 3-17, col. 5-line 64 to col. 6-line 53) or by a clamping member (see col. 8, lines 10-18). Also, Lilleland et al. discloses a plasma processing apparatus in which the upper electrode is secured to a support member by bonding the electrode using an elastomeric joint as claimed claim 9 (see col. 3, lines 47-64 and col. 5-line 37 to col. 6-line 47). Furthermore, the reference discloses that in some cases the electrode can be mechanically clamped to the support member (see col. 5, lines 7-12). In view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus disclosed by either Murai or Saito et al. as to: 1) bond the electrode to the support member as claimed because, for example, the likelihood of breakage of the electrode or debonding from the support member is

reduced as is the distortion, and the thermal contact is improved (see, for example, col. 9, lines 4-17 in the Lilleland et al. reference), or alternatively 2) as to use a clamping member because such structures are suitable and known for mechanically securing the electrode to the support member.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. in view of Degner et al., U.S. Patent 5,074,456 or Lilleland et al., U.S. Patent 6,073,577.

Saito et al. is applied as above but lacks anticipation of disclosing the showerhead electrode securing structure of claim 10. Degner et al. and Lilleland et al. disclose a parallel plate plasma reactor in which a showerhead electrode is secured to a temperature controlled member in an interior of the plasma reaction chamber, the temperature controlled member including a gas passage for supplying a process gas to the showerhead electrode, a cavity and at least one baffle plate located in the cavity, the gas passage supplying process gas so as to pass through the baffle prior to passing through the showerhead electrode (see col. 7-line 54 to col. 8-line 39, and the figures of Degner et al.; and col. 3, lines 47-64 and fig. 1 of Lilleland et al.). In view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the showerhead electrode of the apparatus disclosed by Saito et al. as to be bonded to a temperature controlled member as claimed because in such a way uniform distribution of the processing gases is achieved and the temperature of the electrode can be better controlled.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Luz L. Alejandro
Patent Examiner
Art Unit 1763

April 2, 2002